



Beyond ocean connectivity: embracing advances on early life stages and adult connectivity to assessment and management challenges

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Theme Session E

Beyond ocean connectivity: embracing advances on early life stages and adult connectivity to assessment and management challenges

Title: Migratory herring as a seasonal conveyer of lipids into a resident cod population

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The main flow of lipids from secondary producers to predatory fish, birds and marine mammals is channelled through a few key-species of smaller schooling pelagic fish – the so-called forage fish. Forage fish typically display coordinated long-distance migrations between overwintering areas, spawning areas, and feeding grounds, often across ecosystem boundaries. During the feeding season, they rapidly build large lipid reserves. The reserves are then mobilised during periods of food shortage and fuels both long-distance migration and spawning. As a consequence, resident predatory fish, birds, and mammals are only presented with the opportunity to feast on these high energy forage fish during a narrow time window. In the present study we focused on a local population of Atlantic cod (*Gadus morhua*) situated in the narrow Øresund straight between the Baltic Sea and Kattegat, as well as the lipids conveyed by a population of migratory herring (*Clupea harengus*) that every fall make a stop-over in the Øresund straight on their route from feeding grounds in Skagerrak and the North Sea to spawning grounds in the western Baltic Sea. We found that lipids specifically from migratory herring were stored in livers of larger cod, where they constitute an energy storage that is being depleted over the following months as gonads matures. However, although, herring can easily sustain the energetic requirements of the cod, cod supplemented their diet with lean shore crab (*Carcinus maenas*) containing a particular type of fatty acid that has formerly been linked to the reproductive capacity of cod. We also present indication that herring stock size can co-vary with cod recruitment in the area.